## REMARKS

In the last Office Action, claims 1, 3, 5, 7, 9, 12, 13 and 16-20 were rejected under 35 U.S.C. §103(a) as being anticipated by U.S. Patent No. 5,260,915 to Houlihan ("Houlihan") in view of U.S. Patent No. 5,569,879 to Gloton ("Gloton"). The Examiner stated that Houlihan discloses an arm wearable communication device 10 comprising a case 20b, a wireless communication circuit contained in the device, a wearable body 20a, 20c pivotally mounted to the case 20b to enable wearing of the wearable body 20c, and an antenna 13, 14 disposed between the sound unit 52 and the wireless communication circuit and which is provided in the wearable body. Gloton was cited as disclosing a chip antenna.

Claims 2, 4, 6 and 10 were rejected under 35 U.S.C. §103(a) as being unpatentable over Houlihan in view of Gloton and further in view of U.S. Patent No. 5,943,020 to Liebendoerfer et al. ("Liebendoerfer"). Claim 14 was rejected under 35 U.S.C. §103(a) as being unpatentable over Houlihan in view of Gloton and Liebendoerfer.

Applicants respectfully submit that claims 1-7, 9, 10, 12, 13 and 16-20 patentably distinguish over the prior art of record.

Conventional arm wearable communication devices utilize a helical or whip antenna that either projects from the case or is incorporated into the wrist strap. During use of a conventional device having a projecting antenna, the antenna must be extended from the device, such as by being incorporated into an earphone wire extending from the device to a user's ear.

Arm wearable communication devices have been developed that are detached from the user's arm and held to the user's ear and mouth much like a conventional telephone handset. There are disadvantages associated with use of the above-described antenna types in this type of communication device. Since a projecting helical antenna extends from the device, it can easily be damaged by coming into contact with other objects during use. In addition, in order to reduce the influence of the transmission and reception sensitivity of the human body, consideration must be given to the manner in which the whip antenna is extended. Moreover, it is not realistic for the antenna to be extended at all times.

A loop antenna disposed within the wrist strap changes in length significantly when the device is removed from the user's arm. This results in a large change in antenna sensitivity, particularly in the high frequency cellular telephony band.

The present invention overcomes the foregoing problems by providing an arm wearable communication device having stable and consistent characteristics when worn on the user's arm or removed therefrom and held against the user's ear.

In accordance with one aspect of the present invention, the arm wearable communication device comprises a wireless communication circuit disposed in a case for transmitting and receiving a signal, a wearable body pivotally mounted to the case to enable the device to be worn on a user's arm, a sound unit provided in the wearable body, and a chip antenna located between the sound unit and the wireless communication circuit and provided in the wearable body.

By the foregoing structure, the chip antenna is not accommodated in the case of the communication device but rather in the wearable body between the sound unit and the wireless communication circuit and is electrically connected to the communication device body through coupling parts between the chip antenna and the wearable body.

As a result of the claimed location of the chip antenna in the wearable body, when the communication device is being worn on a user's arm, signal transmission and reception are carried out without interference on the radius side and the ulna side of the user's arm. On the other hand, when the

communication device is detached from the user's arm and placed up to the user's ear, signal transmission and reception is conducted without a reduction in antenna performance because the chip antenna is located away from the case, which is held in the user's hand.

In the embodiment illustrated in Figs. 1 and 2 of the application drawings, the arm wearable communication device has first and second arm holders 2, 3 on opposite sides of a communication device body 1. The arm holders 2 and 3 are pivotably mounted by hinges which are respectively provided in coupling parts between the arm holders 2 and 3 and the communication device body 1. Chip antennas 4 and 5 each having a generally flat or curved shape are disposed inside the respective arm holders 2 and 3. The communication device body 1 is electrically connected to the chip antennas 4, 5 through the respective coupling parts, and is adapted to demodulate a received signal which has been received through the chip antennas 4 and 5 and to modulate a user's voice for transmission. In addition, the communication device body 1 is equipped with a console panel 26 (buttons, as shown in Fig. 5), a liquid crystal panel 27 and the like which are utilized by the user.

Because the chip antenna is located between the sound unit and the wireless communication circuit, when the

device 1 is worn on the user's arm, the chip antennas 4 and 5 are located on the radius side 6 and the ulna side 7 of the arm to carry out signal transmission and reception. When the device 1 is detached from the user's arm and placed up to the user's ear for use, transmission and reception of signals is carried out while avoiding the grounding effect due to the human body.

In the arm wearable communication device of the present invention, when the device is detached from the user's arm and held in the users hand, as well as when it is being worn on the user's arm, the influence of the human body is avoided so that superior telecommunication becomes possible. In addition, the arm wearable communication device is free from the electric wave shielding effect caused by coating. Also, by paying attention to the disposition of the antennas each having optimal directivity when the device is being worn on the user's arm and when it is being held by the user's hand, the chip antennas each of which has a flat shape and has a single directivity are accommodated in the wearable bodies, respectively. As a result, antenna transmission and reception characteristics are adapted to conditions of actual use.

No corresponding structure is disclosed or suggested by the prior art of record.

Independent claim 1 recites an arm wearable communication device comprising a case, a wireless communication circuit contained in the case, a wearable body pivotally mounted to the case, a sound unit provided in the wearable body, and a chip antenna disposed between the sound unit and the wireless communication circuit in the wearable body.

Accordingly, claim 1 recites a chip antenna mounted between a communication circuit and a sound unit in a wearable body of an arm wearable communication device.

In accordance with dependent claim 2, the wearable body comprises a pair of wearable bodies attached to opposite sides of the case, the chip antenna comprises a chip antenna disposed in each of the wearable bodies, and the communication circuit compares signals received by the respective antennas.

Houlihan, as modified by Gloton, fails to render the claimed invention obvious. Houlihan discloses an arm wearable communication device 10 comprising a wireless communication circuit contained in a housing 20b for transmitting and receiving a signal and a sound unit 52 provided in a wearable body. Houlihan does not disclose an antenna disposed between the sound unit 52 and the communication device body in the wearable body.

U.S. Patent No. 4,847,818 to Olsen, which is incorporated by reference into the Houlihan disclosure, discloses a conductor pairs 13, 14 serving as a dipole antenna embedded in the wearable body 5.

However, the dipole antenna of Olsen is not a chip antenna as required by amended independent claim 1, and is not disposed between the sound unit 52 and the communication device body in the wearable body.

The combination of Houlihan and Gloton does not render unpatentable the subject matter of claims 1, 3, 5, 7, 9, 12, 13 and 16-20. The combined teachings of Houlihan and Gloton would not have suggested a dielectric chip antenna as recited by independent claim 1, which is located in the wearable body between the sound unit and the communication device body.

As pointed out above, the claimed location of the chip antenna avoids interference from the human body. When the communication device is worn on a user's arm, signal transmission and reception are carried out without interference on the radius side and the ulna side of the user's arm. When the device is detached from the user's arm and placed up to the user's ear, signal transmission and reception is conducted without a reduction in antenna performance because the chip antenna is located away from the

case, which is held in the user's hand. The structure and benefits of the present invention are not suggested by the combined teachings of Houlihan and Gloton.

Nor do the combined teachings of Houlihan and Gloton render obvious the subject matter of dependent claims 17-20. Dependent claim 17 recites that a portion of the wearable body in which the chip antenna is provided does not have a coating formed thereon that would shield reception of a signal in the vicinity of the chip antenna. Neither Houlihan nor Gloton disclose any such coating. Claim 18 recites that the wearable body has a coating thereon formed of a ceramic material that does not have a signal shielding characteristic. Claim 19 recites that the wearable body has a coating thereon formed of an acrylic glass. Claim 20 recites that the wearable body has a coating thereon formed of a material that does not have a signal shielding characteristic. No such coatings are disclosed by the cited references.

Liebendoerfer does not cure the foregoing defects. Liebendoerfer was cited as disclosing an antenna for use in a dielectric block of a radiotelephone. However, Liebendoerfer does not disclose or suggest the structure of independent claim 1, which recites that the chip antenna disposed in a wearable member between a sound unit and a wireless communication circuit.

Accordingly, applicants respectfully submit that claims 1-7, 9, 10, 12, 13 and 16-20 patentably distinguish over the prior art of record and that the rejections under 35 U.S.C. §103(a) should be withdrawn.

In view of the foregoing amendments and discussion, the application is now believed to be in condition for allowance. Accordingly, entry of the present amendment together with favorable reconsideration and allowance of the claims are most respectfully requested.

Respectfully submitted,

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